

FOR GROUND SUPPORT

1. SCOPE: THIS SPECIFICATION ESTABLISHES THE REQUIREMENTS FOR AN OPERATIONAL TEST PROCEDURE FOR TRAILER INSTALLED M/G SETS.
2. VISUAL INSPECTION: A COMPLETE VISUAL INSPECTION OF THE QUALITY AND WORKMANSHIP OF THE M/G SET, CONTROL PANEL AND INTERCONNECTING WIRING SHALL BE MADE, TO BE FOLLOWED BY MANUAL INSPECTION AS INDICATED IN PARAGRAPH 3 BELOW.
3. MANUAL INSPECTION: THE FOLLOWING INSPECTION STEPS SHALL BE MADE:
  - a. SET THE MAIN REGULATED C/B ON THE INTERIOR CONTROL PANEL IN THE "OFF" POSITION.
  - b. APPLY 440 V. 60 CYCLE 3 PHASE POWER TO THE TRAILER POWER CONNECTOR. (100 AMP. SERVICE)
  - c. SET THE TRAILER POWER CONNECTOR SWITCH IN THE "On" POSITION.

NOTE: WHEN POWER IS APPLIED AN AUDIBLE CLICK WILL BE HEARD AT THE PHASE SENSING RELAY ON THE SYNCHRONOUS MOTOR STARTER PANEL. IF THIS DOES NOT OCCUR, THE PHASE CONNECTION FROM THE TRAILER FEED THROUGH (440V. INPUT) IS WRONG AND MUST BE SWITCHED AT THAT POINT BEFORE THE STARTING CIRCUIT WILL OPERATE.



### 3. MANUAL INSPECTION: (CONT)

- d. PUSH THE LOCAL "START" SWITCH ON THE SYNCHRONOUS MOTOR STARTER PANEL. CONTACTOR "M" SHOULD ACTUATE AND MOTOR SHALL START TO RUN.
- e. OBSERVE A 2 TO 10 SECOND DELAY BEFORE CONTACTOR "G" ACTUATES.
- f. ALLOW M/G SET TO RUN FOR 5 MINUTES, THEN PUSH THE LOCAL "STOP" BUTTON. THE CONTACTORS "M" AND "G" WILL IMMEDIATELY DROP OUT AND THE MOTOR WILL COAST-ROTATE FREELY TO A STOP.
- g. WHEN MOTOR HAS STOPPED MOVE TO THE REMOTE START STATION INSIDE THE TRAILER AND REPEAT ITEMS "d" AND "e."
- h. WITH THE MOTOR OPERATING, SET THE OVER-VOLTAGE CONTROL POTENTIOMETER TO THE CENTER POSITION AND ADJUST THE OUTPUT VOLTAGE ADJUSTMENT CONTROL UNTIL 120 V.  $\pm$  1V. IS READ ACROSS TERMINALS M<sub>1</sub> AND M<sub>0</sub>.

### 4. REGULATOR CHECK: CHECKS WITH A CATHODE RAY OSCILLOSCOPE SHALL BE MADE AS FOLLOWS:

- a. WITH THE OSCILLOSCOPE LOCKED ON A 60 CYCLE SWEEP AND CONNECTED ACROSS 1 AND 2 OF THE REGULATOR TERMINAL BOARD, A 3 PHASE FULL WAVE RECTIFIER OUTPUT OF 6 FAIRLY WELL BALANCED PIPS SHOULD BE OBSERVED. THIS WILL INDICATE THAT CR<sub>1</sub>, CR<sub>2</sub> AND CR<sub>3</sub>, AND T<sub>1</sub>, T<sub>2</sub> AND T<sub>3</sub> ARE OPERATING SATISFACTORILY. IF LESS THAN



#### 4. REGULATOR CHECK: (CONT.)

6 PIPS ARE VISIBLE IT MEANS ONE OF THE REACTORS OR ONE OF THE SELENIUMS ARE NOT OPERATING AND FURTHER CHECKING WITH THE SCOPE ACROSS INDIVIDUAL COMPONENTS SHALL BE MADE TO DETERMINE WHICH ONE IS AT FAULT. SEE FIG 1.

b. PLACE THE SCOPE ACROSS THE OUTSIDE OF THE RECTIFIER CR6. THIS WILL INDICATE THE OUTPUT OF THE DRIVER STAGE T4; 2 PIPS SHOULD APPEAR INDICATING FULL WAVE SINGLE PHASE RECTIFICATION AND SHOULD SHOW THAT THE MAGNETIC AMPLIFIER IS FIRING FOR PART OF EACH HALF CYCLE. IF ONE OF THESE IS MISSING USE THE SCOPE ACROSS INDIVIDUAL COMPONENTS TO FIND THE DEFECTIVE PART. SEE FIG. 2.

c. PLACE THE SCOPE ACROSS THE PLUS AND MINUS OUTPUTS OF CR7 AND CR8. THIS SHOULD INDICATE 6 PIPS FOR THE FULL WAVE 3 PHASE RECTIFIER OUTPUT. IF ANY OF THESE PIPS ARE MISSING IT WILL INDICATE A DEFECTIVE RECTIFIER WHICH CAN BE FOUND BY FURTHER INVESTIGATION WITH THE SCOPE. SEE FIG. 3.

#### 5. LOAD CHECKS: SET UP A 20 KW LOAD BANK EVENLY BALANCED ( $\pm 5\%$ ) ACROSS THE 3 PHASE OUTPUT TERMINALS ON THE SYNCHRONOUS MOTOR STARTER PANEL. CONNECT THIS LOAD THROUGH A KNIFE-SWITCH. CONDUCT A TEST OF THE



## 5 LOAD CHECKS: (CONT.)

CAPABILITIES OF REJECTION AND ACCEPTANCE OF LOAD AS FOLLOWS:

a. CONNECT BRUSH PEN MOTOR BL 902A OF BRUSH OSCILLOGRAPH MODEL BL 222 TO FINCOR MODEL 1102-1 MODULATION AMPLIFIER.

b. MECHANICALLY ZERO THE BRUSH PEN MOTOR BEFORE APPLYING LOAD OR CONNECTING THE AMPLIFIER.

CONNECT AMPLIFIER TO THE GENERATOR AND BRUSH OSCILLOGRAPH. WITH THE GENERATOR VOLTAGE SET AT 120 V. LINE TO NEUTRAL BY A METER WHICH SHALL BE CAPABLE OF READING TO AT LEAST  $1/10$ TH. OF A VOLT, THE AMPLIFIER SHOULD BE BROUGHT TO A COMPLETE NULL SO THAT THE 120 V. CAUSES NO DEFLECTION OF THE BRUSH. IN ORDER TO GET PROPER READINGS WITHIN THE NARROW OPERATION OF  $\pm 1/2$  V THIS SETTING MAY AT TIMES NEED TO BE SOME OTHER VOLTAGE THAN EXACTLY 120, THAT IS IF TRANSIENT RESPONSE IS TO BE MEASURED FROM NO LOAD TO FULL LOAD AND THE MACHINE COMPOUNDS .4 VOLTS, THE VOLTAGE OF THE MACHINE SHOULD BE SET AT 120 AND THE MODULATION AMPLIFIER NULLED AT THIS POINT. UNDER THIS CONDITION LOAD REJECTION OSCILLOGRAPHS CAN BE RUN BECAUSE AT THE END OF THE LOAD REJECTION, THE PEN MOTOR WILL SET UP IN THE CENTER OF



## 5 LOAD CHECKS: (CONT.)

OF THE PAPER. FOR LOAD APPLICATION MEASUREMENTS THE MODULATION AMPLIFIER SHALL BE RECEIVED WITH THE GENERATOR LOADED. BY FOLLOWING THIS PROCEDURE, THE  $\pm 1/2$  V. SWING OF THE BRUSH PEN WILL BE EQUALLY DIVIDED ON THE FINAL SETTING POINT OF THE GENERATOR, ALLOWING THE FINAL SWINGS OF THE GENERATOR TO FALL EQUALLY WITHIN THE CALIBRATED PORTION OF THE VOLTAGE SCALE.

NOTE: IN CALIBRATING THIS INSTRUMENT R10 IS USED TO SET THE GAIN SO THAT APPROXIMATELY .5 VOLTS WILL PRODUCE APPROXIMATELY 5 MILLIMETER DEFLECTION ON THE BRUSH. IF THIS SWING IN EITHER DIRECTION IS NOT EXACTLY THE SAME DISTANCE IT IS NOT DETRIMENTAL TO READING FINAL RESULTS AS LONG AS THE CALIBRATION POINT IS THE SAME AS THAT SPECIFIED FOR THE GENERATOR BEING TESTED,  $\pm 1/2$  VOLT. REGARDLESS OF INSTRUMENT LINEARITY THE SPECIFICATION POINT WILL BE A DEFINITE CALIBRATION OF THE BRUSH AND IT WILL BE EASY TO DETERMINE WHEN THE TRANSIENTS FALL WITHIN THE REQUIREMENTS. A WARM UP PERIOD OF APPROXIMATELY 5 MINUTES



## 5. LOAD CHECKS: (CONT.)

SHOULD BE ALLOWED BEFORE FINAL ADJUSTMENT AND RECORDING.

C. APPLY THE 20 KW. LOAD INSTANTANEOUSLY 5 TIMES AND OBSERVE:

- (1) STEADY STATE VOLTAGE
- (2) RESPONSE BACK TO REGULATION
- (3) VOLTAGE EXCURSION.

## 6. RESULTS:

A. STEADY STATE VOLTAGE SHOULD REMAIN WITHIN  $\pm .3$  V.

B. AFTER APPLICATION OR REJECTION OF LOAD, VOLT SHALL RETURN TO 120 V.  $\pm \frac{1}{2}$  VOLT IN 10 CYCLES OR LESS

C. EXCURSION SHALL NOT BE MORE THAN 5 V. RMS. DURING LOADING AND UNLOADING. USE VTVM ON THIS.

## 7. LOAD UNBALANCE CHECK: REPEAT PARAGRAPH 3.

A, B, C AND PARAGRAPH 5 EXCEPT THAT INSTEAD OF 20 KW. BALANCED LOAD APPLY 10 KW TO ONE PHASE LEAVING THE OTHER PHASES AT NO. LOAD. REQUIRED RESULTS - (SHOULD MEET THE ABOVE PARAMETERS ALSO UNDER THESE UNBALANCED CONDITIONS).



## 8. REGULATOR PROTECTION CHECKOUT:

- a. OVER VOLTAGE: SET THE VOLTAGE CONTROL POTENTIOMETER TO FULL DECREASE POSITION AND THE OVER VOLTAGE CONTROL TO #1 POSITION, (125 V). ROTATE THE VOLTAGE CONTROL POTENTIOMETER TO FULL INCREASE VOLTAGE. RESULT: THE MOTOR WILL SHUT DOWN.
- b. SET THE VOLTAGE CONTROL POTENTIOMETER TO THE FULL DECREASE POSITION AND THE OVER VOLTAGE CONTROL TO THE #2 POSITION, (135 V). ROTATE THE VOLTAGE CONTROL POTENTIOMETER TO FULL INCREASE VOLTAGE. RESULT: THE MOTOR WILL SHUT DOWN.
- c. SET THE VOLTAGE CONTROL POTENTIOMETER TO THE FULL DECREASE POSITION AND THE OVER VOLTAGE CONTROL TO THE #3 POSITION, (145 V). ROTATE THE VOLTAGE CONTROL POTENTIOMETER TO FULL INCREASE VOLTAGE. RESULT: THE MOTOR WILL SHUT DOWN.
- d. RESET: RESET OVER VOLTAGE CONTROL TO CENTER POSITION, ROTATE VOLTAGE CONTROL POTENTIOMETER TO INCREASE VOLTAGE APPROXIMATELY  $\frac{1}{2}$  OF FULL TRAVEL. START MOTOR AND ADJUST VOLTAGE OUTPUT TO  $120 \text{ V} \pm 1 \text{ V}$ . FOR DELIVERY.

9. CONCLUSION:



9. CONCLUSION: IF THE UNIT MEETS THE PARAMETERS OUTLINED ABOVE IT IS CONSIDERED TO MEET THE OPERATIONAL REQUIREMENTS OF THIS SPECIFICATION. ALL TESTS ARE TO BE RUN AT NORMAL CONDITIONS OF WEATHER AND ATMOSPHERE.

